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1 A method of forming an electrical device including providing a substrate  
2 having a first dielectric upper layer, forming a depression in said first dielectric upper layer,  
3 filling said depression with an electrically conductive film having an electrical resistivity and  
4 an upper surface that is co-planar with the first dielectric upper layer, said method  
5 comprising:

6 reacting a chemical composition with at least one monolayer of said upper  
7 surface; and

8 forming a second dielectric upper layer over said electrically conductive film  
9 and said first dielectric upper layer, wherein:

10 at least an exposed surface of the electrically conductive film is  
11 unoxidized;

12 said second dielectric upper layer is adhered to said electrically  
13 conductive film.

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15 2. The method as defined in Claim 1, wherein reacting a chemical composition  
16 with at least one monolayer of said upper surface comprises:

17 providing a nitrogen-containing composition;

18 heating said first dielectric upper layer; and

19 exposing said upper surface to said nitrogen-containing composition to form  
20 a chemical reaction compound having a higher resistance to oxidation than said  
21 electrically conductive film.

3 The method as define in Claim 1, wherein forming a second dielectric upper  
4 layer over said electrically conductive film and said first dielectric upper layer comprises *in*  
5 *situ* depositing said second dielectric upper layer over said electrically conductive film and  
at least one monolayer of said upper surface.

7       4. The method as define in Claim 1, wherein forming a second dielectric upper  
8 layer over said electrically conductive film and said first dielectric upper layer comprises *in*  
9 *situ* depositing said second dielectric upper layer over said electrically conductive film and  
10 said first dielectric upper layer after reacting said chemical composition with at least one  
11 monolayer of said upper surface.

13        5. The method as define in Claim 1, wherein reacting said chemical composition  
14 with at least one monolayer of said upper surface forms a passivation layer upon said upper  
15 surface of said electrically conductive film.

1       6. A method of forming an electrical device including providing a substrate  
2 having a first dielectric upper layer; forming a depression in said first dielectric upper layer,  
3 filling the depression with an electrically conductive film having an upper surface that is co-  
4 planar with the first dielectric upper layer, said method comprising:

5             reacting a chemical composition with at least one monolayer of said upper  
6 surface to form a passivation layer having a thickness not greater than about 50Å  
7 upon the upper surface; and

8             forming a second dielectric upper layer over said electrically conductive film  
9 and said first dielectric upper layer, wherein:

10                 at least an exposed surface of the electrically conductive film is  
11 unoxidized;

12                 said second dielectric upper layer is adhered to said electrically  
13 conductive film.

14        7. The method as define in Claim 6, wherein the passivation layer upon the  
15 upper surface has a thickness in a range from about 2Å to about 20Å.  
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17        8. The method as define in Claim 6, wherein reacting said chemical  
18 composition with said at least one monolayer comprises forming a passivation layer upon  
19 said upper surface that is adsorbed onto said at least one monolayer.  
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1                   9. The method as define in Claim 6, wherein said passivation layer is formed by  
2 the steps comprising:

3                   forming a first layer by chemically reacting components of said chemical  
4 composition and said at least one monolayer; and

5                   forming a second layer by adsorbing portions of said chemical composition  
6 onto said first layer.

7  
8                   9. A method of forming an electrical device, the method comprising:

10                  forming an electrically conductive interconnect disposed within a first  
11 dielectric layer, said electrically conductive interconnect having an upper surface;

12                  forming a first passivation layer disposed upon said upper surface, said first  
13 passivation layer including chemical reaction products and solid solution mixtures  
14 between said electrically conductive interconnect and a chemical compound; and

15                  forming an ILD disposed upon said first dielectric layer and upon said upper  
16 surface, said ILD being continuously adhered to said upper surface.

17                  11. The method as defined in Claim 10, wherein forming said electrically  
18 conductive interconnect further comprises:

19                  forming a first titanium liner layer within a depression in said first dielectric  
20 layer;

21                  forming a first titanium nitride layer upon said first titanium liner layer; and

22                  forming a tungsten film upon said first titanium nitride layer so as to fill the  
23 depression.

1           12. The method as defined in Claim 10, wherein forming said first passivation  
2 layer further comprises forming a first tungsten nitride layer upon said upper surface, wherein  
3 said first tungsten nitride layer has a thickness of less than about 50Å.

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5           13. The method as defined in Claim 10, further comprising forming a second  
6 passivation layer comprising ammonia and its derivatives that is adsorbed upon said first  
7 passivation layer, wherein said first passivation layer comprises a tungsten nitride compound.

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9           14. The method as defined in Claim 10, wherein said first passivation layer  
10 comprises a layer upon said upper surface comprising ammonia and its derivatives that is  
11 adsorbed upon said upper surface.

12  
13           15. A method of forming an electrical device, the method comprising:  
14                 forming an electrically conductive interconnect disposed within a dielectric  
15                 layer, said electrically conductive interconnect having an upper surface, and further  
16                 including the steps of:

17                 forming a titanium liner layer disposed within a depression in said  
18                 dielectric layer;

19                 forming a titanium nitride layer disposed upon said titanium liner  
20                 layer; and

21                 forming a tungsten film disposed upon said titanium nitride layer and  
22                 filling said depression;

23                 forming a passivation layer composed of tungsten nitride, disposed upon said  
24                 upper surface, and having a thickness of less than about 50Å; and

25                 forming an ILD disposed upon said dielectric layer and upon said upper  
26                 surface, said ILD being continuously adhered to said upper surface.

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- 1 16. A method of forming an electrical device, the method comprising:  
2 forming an electrically conductive interconnect having an upper surface and  
3 being disposed within a dielectric layer, and further including the steps of:  
4 forming a titanium liner layer disposed within a depression in said  
5 dielectric layer;  
6 forming a titanium nitride layer disposed upon said titanium liner  
7 layer; and  
8 forming a tungsten film disposed upon said titanium nitride layer and  
9 filling said depression;  
10 forming a first passivation layer comprising a tungsten nitride compound and  
11 being disposed upon said upper surface;  
12 forming a second passivation layer comprising ammonia and its derivatives  
13 that is adsorbed upon said first passivation layer; and  
14 forming an ILD disposed upon said dielectric layer and upon said upper  
15 surface, said ILD being continuously adhered to said upper surface.

1        17. A method of forming an electrical device, the method comprising:  
2              forming an electrically conductive interconnect disposed within a dielectric  
3              layer, said electrically conductive interconnect having an upper surface, and further  
4              including the steps of:

5                  forming a titanium liner layer disposed within a depression in said  
6              dielectric layer;

7                  forming a titanium nitride layer disposed upon said titanium liner  
8              layer; and

9                  forming a tungsten film disposed upon said titanium nitride layer and  
10              filling said depression;

11                 forming a passivation layer disposed upon said upper surface comprising  
12              ammonia and its derivatives that are adsorbed upon said upper surface; and

13                 forming an ILD disposed upon said dielectric layer and upon said upper  
14              surface, said ILD being continuously adhered to said upper surface.

15  
16        18. A method of forming an interconnect in an electronic device, the method  
17              comprising:

18                 forming a metallic structure disposed within a first silicon oxide layer, said  
19              metallic structure having an upper surface;

20                 forming a passivation layer disposed upon said upper surface, said passivation  
21              layer including chemical reaction products and solid solution mixtures between said  
22              metallic structure and a chemical compound; and

23                 forming a second silicon oxide layer disposed upon said first silicon oxide  
24              layer and upon said upper surface, said second silicon oxide layer being  
25              continuously adhered to said upper surface.  
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1       19. The method as defined in Claim 18, wherein forming said metallic structure  
2 further comprises:

3             forming a titanium liner layer disposed within an interconnect corridor in said  
4 first silicon oxide layer;

5             forming a titanium nitride layer disposed upon said titanium liner layer; and

6             forming a tungsten film disposed upon said titanium nitride layer.

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8       20. The method as defined in Claim 18, wherein:

9             said passivation layer further comprises forming a tungsten nitride layer  
10 disposed upon said upper surface; and

11             said tungsten nitride layer having a thickness of less than about 50Å.

12  
13       21. The method as defined in Claim 18, further comprising forming a second  
14 layer comprising ammonia and its derivatives that is adsorbed upon said passivation layer,  
15 wherein said passivation layer comprises a tungsten nitride compound.

16  
17       22. The method as defined in Claim 18, wherein said passivation layer comprises  
18 a layer upon said upper surface comprising ammonia and its derivatives that is adsorbed upon  
19 said upper surface.

1           23. A method of forming an interconnect in an electronic device, the method  
2 comprising:

3                 forming a metallic structure disposed within a first silicon oxide layer, said  
4                 metallic structure having an upper surface, and further including the steps of:

5                 forming a titanium liner layer disposed within an interconnect corridor  
6                 in said first silicon oxide layer;

7                 forming a titanium nitride layer disposed upon said titanium liner  
8                 layer; and

9                 forming a tungsten film disposed upon said titanium nitride layer;

10                 forming a passivation layer composed of tungsten nitride, having a thickness  
11                 of less than about 50 $\text{\AA}$ , and being disposed upon said upper surface; and

12                 forming a second silicon oxide layer disposed upon said first silicon oxide  
13                 layer and upon said upper surface, said second silicon oxide layer being  
14                 continuously adhered to said upper surface.

1           24. A method of forming an interconnect in an electronic device, the method  
2 comprising:

3                 forming a metallic structure disposed within a first silicon oxide layer, said  
4                 metallic structure having an upper surface, and further including the steps of:

5                     forming a titanium liner layer disposed within an interconnect corridor  
6                     in said first silicon oxide layer;

7                     forming a titanium nitride layer disposed upon said titanium liner  
8                     layer; and

9                     forming a tungsten film disposed upon said titanium nitride layer;

10                 forming a first passivation layer disposed upon said upper surface and  
11                 composed of a tungsten nitride compound;

12                 forming a second layer comprising ammonia and its derivatives that is  
13                 adsorbed upon said first passivation layer; and

14                 forming a second silicon oxide layer disposed upon said first silicon oxide  
15                 layer and upon said upper surface, said second silicon oxide layer being  
16                 continuously adhered to said upper surface

1           25. A method of forming an interconnect in an electronic device, the method  
2 comprising:

3                 forming a metallic structure disposed within a first silicon oxide layer, said  
4                 metallic structure having an upper surface, and further including the steps of:

5                 forming a titanium liner layer disposed within an interconnect corridor  
6                 in said first silicon oxide layer;

7                 forming a titanium nitride layer disposed upon said titanium liner  
8                 layer; and

9                 forming a tungsten film disposed upon said titanium nitride layer;

10                 forming a passivation layer disposed upon said upper surface and composed  
11                 of ammonia and its derivatives that is adsorbed upon said upper surface; and

12                 forming a second silicon oxide layer disposed upon said first silicon oxide  
13                 layer and upon said upper surface, said second silicon oxide layer being  
14                 continuously adhered to said upper surface.

15                 Add AB

16                 Add CS